Alg. 2 Warm Up #11-3

Solve using the quadratic formula. Answer exact and simplified. Use $\sqrt{-1} = i$

1. $2x^2 + 5x + 4 = 0$

2. $2x^2 + 5x - 3 = 0$

3. Write a polynomial function for a graph that passes through (-1, 60) and has

three x-intercepts: (-4, 0), (1, 0), (3, 0)

Review & Preview

HW Questions:

8-36. Where does the graph $y = (x+3)^2 - 5$ cross the x-axis?

8-37. If you were to graph the function $f(x) = (x-74)^2(x+29)$, where would the graph intersect the x-axis?

8-38. For each pair of intercepts given below, write an equation for a quadratic function in standard form.

a. $(-3,0)$ and $(2,0)$

b. $(-3,0)$ and $(\frac{1}{2},0)$

8-39. What is the degree of each polynomial function below?

a. $P(x) = 0.08x^2 + 28x$

b. $y = 8x^2 - \frac{1}{7}x^5 + 9$

c. $f(x) = 5(x+3)(x-2)(x+7)$

d. $y = (x-3)^2(x+1)(x^3+1)$

$x^3 \cdot x^3 =$

6th degree

8-40. Consider the graphs of the following types of functions. Which functions are polynomial functions? Explain your reasoning.

a. Parabolas

b. Exponentials

c. Cubics

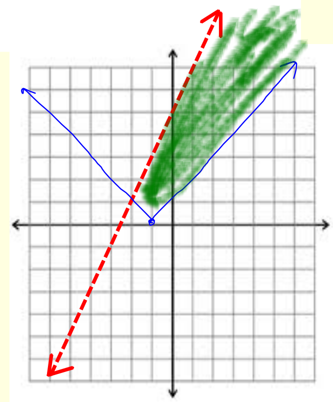
d. Lines

e. Circles

8-41. Graph each system below and shade the solution region.

a. $y \geq x^2 - 4$
$y < -3x + 1$

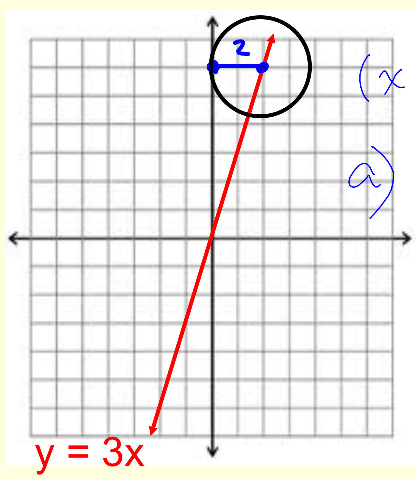
b. $y < 2x + 5$
$y \geq |x + 1|$



8-42. A circle with its center on the line $y = 3x$ in the 1st quadrant is tangent to the y-axis.

a. If the radius is 2, what is the equation of the circle?

b. If the radius is 3, what is the equation of the circle?



$(x-h)^2 + (y-k)^2 = r^2$

a) $(x-2)^2 + (y-6)^2 = 4$

8-43. Sketch the graph of each function below on the same set of axes.

a. $y = 2^x$ b. $y = 2^x + 5$ c. $y = 2^x - 5$

8-44. For each equation, find two solutions $0° \le \theta < 360°$, which make the equation true. You should not need a calculator.

a. $\sin\theta = \frac{1}{2}$ b. $\tan\theta = \sqrt{3}$

c. $\cos\theta = \frac{\sqrt{3}}{2}$ d. $\sin\theta = -\frac{\sqrt{2}}{2}$

Alg. 2B Polynomial ÷ #1 Classwork   Name ________

Team __ Per _

$f(x) = x^3 - 2x^2 - 5x + 6$

1) What is the maximum number of x-intercepts? ___

2) What are the possible factors to get 6 on the end?

$(x+2)(x+3)$ or $(x-2)(x-3)$ or $\boxed{(x+1)}(x+6)$

or $(x-1)(x-6)$

3) Let's try to ÷ out $(x+1)$:

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$$\begin{array}{r} x^2-3x-2 \\ x+1 \overline{)\, x^3-2x^2-5x+6} \\ -(x^3+x^2) \downarrow \quad \downarrow \\ \hline -3x^2-5x+6 \\ -(-3x^2-3x) \\ \hline -2x+6 \\ -(-2x-2) \\ \hline 8 \end{array}$$

8 remainder

$x^2(x+1)$

x^3+x^2

$-3x(x+1)$

$-3x^2-3x$

x+1 is not a factor of f(x)

How about $(x-1)$?

$x^2(x-1)$

x^3-x^2

$-x(x-1)$

$-x^2+x$

$$\begin{array}{r} x^2-x-6 \\ x-1 \overline{)\, x^3-2x^2-5x+6} \\ -(x^3-x^2) \\ \hline -x^2-5x+6 \\ -(-x^2+x) \\ \hline -6x+6 \\ -(-6x+6) \\ \hline \end{array}$$

Conclusion: $f(x)=x^3-2x^2-5x+6$

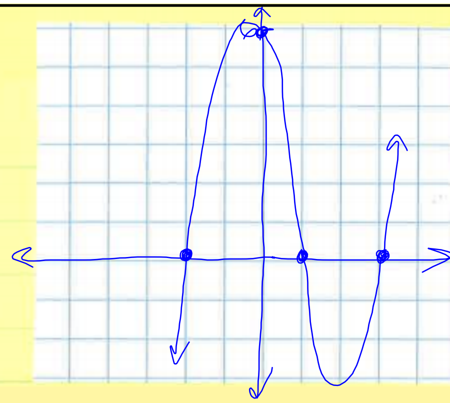
$f(x)=(x-1)(x^2-x-6)$

completely factored $\Big\}$ $=(x-1)(x-3)(x+2)$

y-int: $(0,6)$

Use your result to sketch the graph of $f(x)$

- plot x-int
- plot y-int
- consider right side going up or down?
- Any repeat factors?
  (the graph just touches x-axis there) if power was even, if odd passed through.



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4) $f(x) = x^3 + 7x^2 + 7x - 15$ Find the roots and sketch the graph.

first step: consider what factors would create -15 on the end. $(x-5)(x+3)$ or $(x+5)(x-3)$

~~$1 \cdot -15$~~
~~$-1 \cdot 15$~~

now try ÷

$$
\begin{array}{r}
x^2 + 2x - 3 \\
x+5 \overline{)\, x^3 + 7x^2 + 7x - 15} \\
-(x^3 + 5x^2) \\
\hline
2x^2 + 7x - 15 \\
-(2x^2 + 10x) \\
\hline
-3x - 15 \\
-(-3x - 15) \\
\hline
\end{array}
$$

☺

★ use pencil so you can erase & try another if needed.

Conclusion:

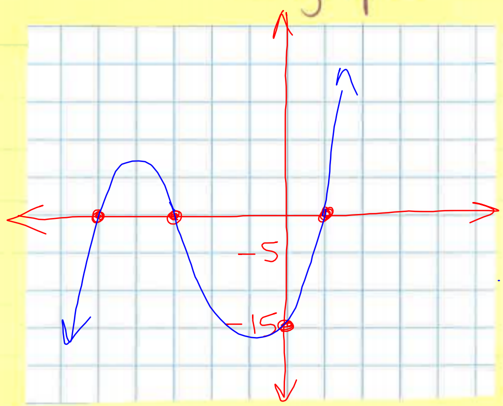
$f(x) = x^3 + 7x^2 + 7x - 15$

$= (x+5)(x^2+2x-3)$

$= (x+5)(x+3)(x-1)$

y-int: $(0, -15)$

Sketch the graph:



5) $f(x) = 3x^3 + 10x^2 - 27x - 10$

$-10 \cdot 1$
$10(-1)$

Possible factors to get -10: $(x+5)(x-2)$
$(x-5)(x+2)$

What about the leading coefficient 3?

We need $(3x \quad)(x$

Given that $\boxed{(3x+1)}$ is a factor of $f(x)$, use long ÷ to help find all the factors of $f(x)$

$3x+1 \overline{)\, 3x^3}$

6) For $(x^4 - 6x^3 + 18x - 4) \div (x-2)$ use a place holder for the missing x^2 term: $0x^2$

Do the division.

HW: 8 -

120 ---> 128,

skip 126